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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/083,877  | 02/25/2002  | Alan Wong            | 10559/591001/P12772 | 4750             |
| 20985   | 7590        | 08/12/2004           | EXAMINER            |                  |
| FISH & RICHARDSON, PC<br>12390 EL CAMINO REAL<br>SAN DIEGO, CA 92130-2081 |             |                      | LUU, THANH X        |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2878                |                  |

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |  |                     |  |
|------------------------------|------------------------|--|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> |  | <b>Applicant(s)</b> |  |
|                              | 10/083,877             |  | WONG ET AL.         |  |
|                              | <b>Examiner</b>        |  | <b>Art Unit</b>     |  |
|                              | Thanh X Luu            |  | 2878                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-47,49-81 and 83 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42-44,81 and 83 is/are allowed.
- 6) ☒ Claim(s) 1-41,45-47 and 49-80 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____.                                   |

### **DETAILED ACTION**

This Office Action is in response to amendments and remarks filed February 9, 2004. Claims 1-47, 49-81 and 83 are currently pending.

#### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a first periodic structure comprising at least two features, with each feature having a first width, a second periodic structure comprising at least two features having a second width, wherein the second width differs from the first width; the target mimicking various structures: a flash memory array; the electrical device comprises a memory device element or a logic device element; the overlap in structures; the connected features; the nested features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### ***Claim Objections***

2. Claims 13-16, 64 and 65 are objected to because of the following informalities:

Regarding claims 13-16, 64 and 65, it is unclear in its given context how a target structure "mimics" another structure.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 28, 55 and 70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 28, 55 and 70, it is unclear how the first width of each feature of the first periodic structure is different from the second width of each feature of the second periodic structure and yet the first periodic structure and the second periodic structure shares at least one feature. That is, the claim limitations of claim 28 contradict the limitations of claim 1.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 5-8, 10-21, 24, 26, 27, 29-36, 39, 41, 45-47, 51, 53, 54, 56-68, 71-75, 78 and 80, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Sugaya et al. (U.S. Patent 5,783,833).

Regarding claims 1, 5-8, 10-21, 24, 26, 27, 29-36, 39, 41, 45-47, 53, 54, 56-68, 71-75, 78 and 80, Sugaya et al. disclose (see Figs. 17 and 19) a method of measuring, comprising: providing an optical metrology target, the target comprising: a first periodic structure having at least two features (patterns in 148a) each feature having a first width and the first periodic structure having a first pitch; and a second periodic structure comprising at least two features (patterns in 119a) having a second width differing from the first width and the second periodic structure having a second pitch that differs from the first pitch; illuminating (with 111) the target with a light source; receiving (with 110 or 116) an optical signal from the target; and analyzing (with 117) the optical signal. The measurement is non-destructive, the light source is a coherent light source (see col. 20, lines 1-3) and a non-coherent light source in the visible spectrum. A computer program is inherent since the analyzing is automatically carried out. As understood, the target mimics the structures as claimed. Sugaya et al. also disclose (see Fig. 2) third and fourth periodic structures as claimed. Sugaya et al. further disclose (see Fig. 8) the lengths of the structures are equal. In addition, Sugaya et al. disclose (see Fig. 2) IC patterns having at least one electric element on the wafer. At least one of the features is connected to another feature since the features are all disposed on the same plate.

7. Claims 1-5, 7-10, 24-27, 29-31, 33, 35-39, 41, 45-47, 51-54, 56-58, 60, 62, 63, 73, 74, 76, 77 and 80, as understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Niu et al. (U.S. Patent 6,433,878).

Regarding claims 1-5, 7-10, 24-27, 29-31, 33, 35-39, 41, 45-47, 51-54, 56-58, 60, 62, 63, 73, 74, 76, 77 and 80, Niu et al. disclose (see Fig. 16) a method of measuring,

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comprising: providing an optical metrology target, the target comprising: a first periodic structure having at least two features (OPC lines 114) each feature having a first width and the first periodic structure having a first pitch; and a second periodic structure comprising at least two features (112) having a second width differing from the first width and the second periodic structure having a second pitch that differs from the first pitch; illuminating (see Fig. 17) the target with a light source (125); receiving (with 126) an optical signal from the target; and analyzing (with 130) the optical signal. Niu et al. also disclose measuring a pitch (see col. 10, lines 61-67) and third and fourth periodic structures (other patterns in Fig. 16) as claimed. In addition, Niu et al. disclose a UV light source (see Figs.).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 9, 22, 23, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al.

Regarding claim 9, Sugaya et al. disclose the claimed invention as set forth above. Sugaya et al. do not specifically disclose a UV light source. However, UV light sources are well known and choosing the type of light source requires only routine skill in the art. It would have been obvious to a person of ordinary skill in the art at the time

the invention was made choose a UV light source in the method of Sugaya et al. to reduce interference from ambient visible light.

Regarding claims 22, 23, 49 and 50, Sugaya et al. disclose the claimed invention as set forth above. Sugaya et al. do not specifically disclose the size of the features or structures. However, choosing a specific size of the features or structures is a matter of design choice and requires only routine skill in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the claimed sizes in the apparatus and method of Sugaya et al. to obtain more accurate or precise alignment.

10. Claims 40 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al. in view of Irie et al. (U.S. Patent 6,118,516).

Regarding claims 40 and 79, Sugaya et al. disclose the claimed invention as set forth above. Sugaya et al. do not specifically disclose a curvilinear shaped feature. Irie et al. teach (see Figs. 18A and 18B) that rectilinear and curvilinear shapes are interchangeable. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide curvilinear shapes in the apparatus and method of Sugaya et al. in view of Irie et al. as desired for improved detection.

11. Claims 25, 52 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya et al. in view of Ogasawara et al. (U.S. Patent 6,606,149).

Regarding claims 25, 52 and 69, Sugaya et al. disclose the claimed invention as set forth above. Sugaya et al. do not specifically disclose overlapping the structures. Ogasawara et al. teach (see Fig. 1e) overlapping periodic structures. Thus, it would

have been obvious to a person of ordinary skill in the art at the time the invention was made to overlap the features of Sugaya et al. in view of Ogasawara et al. as desired for improved and more compact detection.

***Allowable Subject Matter***

12. Claims 42-44, 81 and 83 are allowed over the prior art of record.

***Response to Arguments***

13. Applicant's arguments filed February 8, 2004 have been fully considered but they are not persuasive.

Applicant asserts that the OPC lines are part of the mask and not a grating pattern formed on the wafer, and thus, would not meet the claim limitations. Examiner disagrees. It appears that Applicant has misunderstood the prior art. The grating shown in Fig. 16 and 18 of Niu et al. is the mask (see col. 9, lines 52-54). Furthermore, Fig. 17 of Niu et al. shows measurement of the mask, not a grating on a wafer formed from the mask. As understood, the periodic structures and measurements of the mask of Niu et al. read on Applicant's claimed invention.

Applicants other remarks are moot in view of the new grounds of rejection.

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

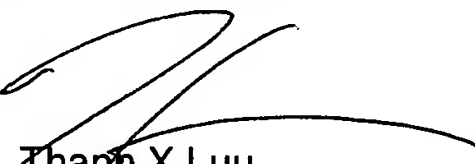


MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X Luu whose telephone number is (571) 272-2441. The examiner can normally be reached on M-F (6:30-4:00) First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thanh X Luu  
Primary Examiner  
Art Unit 2878